

# Activity of the Healthcare and Social- Healthcare Network of Catalonia 2006

Healthcare  
Activity

Report on  
Registers of  
the Minimum  
Basic Data  
Set (CMBD)



Generalitat de Catalunya  
Departament  
de Salut



**CatSalut**

Servei Català  
de la Salut

# ACTIVITY OF THE HEALTHCARE AND SOCIAL-HEALTHCARE NETWORK OF CATALONIA. 2006

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## INTRODUCTION

Maintaining the general population in good health should be one of the key objectives of any government, especially a region with the level of social and economic development of Catalonia. To make this possible, it is necessary to provide additional services in preventive medicine and public health in general, and to improve the creation and maintenance of healthcare and social-healthcare networks.

These services should be framed within a context of limited financial resources, where it is necessary to make the right decisions to ensure resources are used effectively and efficiently. It is also always necessary to ensure that the distribution of existing resources and the planning of new resources are even throughout the region.

Within this context, having access to quality information that matches needs constitutes a strategic resource that can provide basic support for the organization's decision-making processes.

Information is a basic element in all healthcare organizations because it enables the authorities to make decisions that affect people's health while ensuring respect for the criteria of fairness and efficiency.

Within the framework of the Catalan healthcare system, the mission of the

Ministry of Health is to plan public healthcare services, while the mission of the Catalan Healthcare Service (CatSalut) is to contract suppliers in the different healthcare networks.

For this reason, both organizations need to have access to a solid information system that provides them with the data they need to meet these objectives.

The minimum basic data set (though the abbreviation in English is MBDS, in this document, the abbreviation CMBD will be used) is a systematic register of morbidity and healthcare activity that constitutes a very useful tool for healthcare and social-healthcare centers, suppliers and healthcare administrations because it provides a clear record of the pathologies treated and how they evolve over time, the characteristics of the healthcare provided and how activity is distributed in the region.

The history of the CMBD in Catalonia formally began with the Order of 23 November 1990, which made it compulsory for all public and private hospitals in Catalonia to draw up a minimum basic data set on hospital discharges with information on acute-care hospitalization activity.<sup>1,2</sup>

Since then, the work done by hospitals and the public administration has made it possible to improve the quality and comprehensiveness of data and increase accessibility.<sup>3,4</sup> Moreover, increasing requirements for

information on healthcare processes provided at ambulatory facilities have made it possible to include data on major ambulatory surgery and day hospitals in the CMBD since 1996.

Starting in 1995, systematized notification was started up on the activity of single-specialty psychiatric hospitals; in 1998, the CMBD for mental-health ambulatory centers was created; and, finally, in 1999, the CMBD for social-healthcare resources was created. In 2002, these registers<sup>5</sup> were regulated in accordance with the rules in force and were listed with the Spanish Data-Protection Agency.

In early 2001, all CMBD registers became the responsibility of a single unit. At the same time, development began on the CatSalut Systems Plan, the main objective of which was to integrate CatSalut's existing set of healthcare information, ensure data transmission was safe and maintain the confidentiality of personal data. In accordance with this policy, CMBD registers were unified in 2003 in terms of data management and to define the common variables shared by all networks.

The Activity Registries Management Division is currently responsible for managing activity records for the rendering of healthcare services in acute-care hospitals, the mental-health network (hospitalization and ambulatory mental-health centers)

and the network of social-healthcare resources, among other tasks.

Based on the CMBD registers, annual information is drawn up for publication in monograph format ("Healthcare Activity" collection) or as reports published by CatSalut every other year.<sup>6-15</sup> The first monograph with information on all CMBD registers was drawn up based on data from the year 2000.

The current edition corresponds to the activity of 2006. The reports published by CatSalut have the same structure as the monographs and contain all the same tables and figures, but do not have explanatory text. They are therefore complementary documents that make it possible to carry out comparative analysis of the year's activity of the Catalan healthcare network. The reports and monographs are available on the Catalan Healthcare Service website [http://www10.gencat.net/catsalut/cat/prov\\_CMBDpublicacions.htm](http://www10.gencat.net/catsalut/cat/prov_CMBDpublicacions.htm)

The reports and monographs published each year attempt to maintain the same structure, format and layout. However, changes occur in healthcare activity that create other data needs, which is why new analyses, tables and figures are regularly added to enhance the content.

The information in the CMBD registers is made available to managers, healthcare professionals and researchers who need it, while

respecting at all times the regulations in force on personal-data protection. The Catalan Ministry of Health and Catalan Healthcare Service encourage the use of this information because they understand it is a way to achieve the objectives proposed and to improve and maintain the quality of the registers.

## REGISTERS OF THE MINIMUM BASIC DATA SET (CMBD)

### General Objectives and Characteristics

The basic aim of the CMBD registers is to provide comprehensive, valid databases on morbidity and activity in hospitals and ambulatory centers in the healthcare and social-healthcare network of Catalonia. These data provide a clear picture of the diseases treated and make it possible to evaluate the way resources are used, provide support and improve healthcare planning, manage the purchase of services and fine-tune the payment system.

The CMBD registers currently contain population-based information on the following healthcare activity:

Hospital care (CMBD-HA):

Standard hospitalization.  
Major ambulatory surgery procedures (CMA).  
Other care: ambulatory care in day hospitals (HdD) and home hospitalization.

Psychiatric care:

Hospitalization in the mental-health network (CMBD-SMH register).  
Ambulatory care in the mental-health network (CMBD-SMA register): mental-health centers for children and adolescents, and centers for adults.

Social healthcare (CMBD-RSS register):

Hospitalization in long-term units, convalescent units and palliative-care units.

Care in acute-care hospitals: social-healthcare interdisciplinary functional units (UFISS).

Home care (PADES).

Ambulatory care in day hospitals.

The registers are an accessible source of information for internal and external users and respond to the needs of different users. In all cases, the release of data is subject to regulations in force on confidentiality and the use of information.

### Description of Variables

The CMBD registers gather data coded in accordance with pre-established criteria so they are compatible and comparable with each other and other information systems. Bearing in mind the specific characteristics of each register, the gathered variables are grouped in two sections: variables shared by all registers and specific variables for each register.

### Common Variables

#### Personal-identification variables:

- type of register
- personal-identification code (CIP)
- patient number
- date of birth
- sex
- town of residence

- municipal district of residence
- country of residence

#### Process-related variables:

- supplying unit
- scope
- date period begins
- date period ends
- type of activity
- financial system
- date care begins
- admission circumstances
- source
- date care ends
- discharge circumstances
- transfer supplying unit
- specific program

#### Clinical-care variables:

- diagnoses (main diagnosis and nine secondary diagnoses)
- external cause (up to five external causes)
- procedures (main procedure and seven secondary procedures)
- external procedures (main external procedure and one other procedure)

#### Register-identification variables:

- care number
- identification number of each register processed

#### Specific Variables

The specific variables for each register are described in the chapters, which provide an analysis of the activity of each register.

#### Methodology

In general, the same data-analysis methodology was used for all the CMBD registers. However, given

the different characteristics of the registers, some registers required specific treatment, as described in the corresponding chapters.

The criteria for encoding common and specific variables are described in the respective notification manuals.<sup>16-19</sup>

- For calculations in this report involving census figures (population pyramids and hospitalization rates), we used the **population** of Catalonia that appears in the central register of people with public healthcare coverage (RCA) of the Catalan Healthcare Service of 31 December 2005.

- The **supplier units** that provide CMBD registers with data have been given codes in accordance with the criteria of the CatSalut register of supplying units.<sup>20</sup>
- Until 2002, the number of **patients** was calculated using the center code and patient code. The patient code made it possible to identify patients that had been treated more than once at the same center, but it did not indicate whether the patient had received treatment at more than one center. For this reason, the number of patients may be slightly higher than actual values, which means that mean values of contacts and episodes per patient may be lower than actual values.

- The **personal identification code** (CIP) has been included in the CMBD register since 2003. This variable enables analysts to make a

more approximate calculation of the number of patients, because even when a patient is treated at different centres, he or she is counted as only one patient.

Nonetheless, it should be borne in mind that this calculation is not exhaustive because the CIP is not available in all cases. Patients who live outside Catalonia do not have a CIP and, for some contacts, this variable is not included, even for patients who live in Catalonia.

- Three variables are available to find out **where a patient lives**: the town of residence (in the case of residents of Spain), the municipal district (in the case of residents of the city of Barcelona) and the country of residence (in the case of foreigners).

The residence data of patients with a CIP who lived in Catalonia corresponded to the data in the CatSalut RCA.

- The **geographic distribution** of activity is presented in different levels: by healthcare region<sup>21</sup> (RS) and by regional healthcare government (GTS)<sup>22</sup>, in accordance with the latest restructuring of the regional borders of the healthcare administration in Catalonia (*FIGURE 1*). In the case of the Barcelona GTS, the information is also broken by municipal district.
- The **relevance index** was used for flow analysis based on place of residence and the regional distribution of resources used. This indicator is used to calculate the percentage of cases of

residents of a specific region who are treated using the resources of that same region.

- In calculations in which the analysis is done based on age, sex or length of stay, **analysis units** were considered **null and void** if they were not valid for any of these variables.
- Analysis units with any other invalid variables were included in the **unknown** category of the corresponding variable.
- In the tables, percentages below 0.05% were indicated as “0.0” and when there were no cases, the percentage was indicated as “-”.
- In all registers, the clinical-care variables were codified in accordance with the criteria of the International Classification of Diseases, Ninth Revision, Clinical Modification (**ICD-9-CM**)<sup>23</sup>, which classifies more than 13,000 **diagnostic codes** in **17 major groups**, plus the **V code**, which gathers the factors that affect patients’ health status and contacts with healthcare services. The more than 4000 **procedure codes** are classified in **16 major groups**.
- With the aim of facilitating comprehension of the information on diagnoses and procedures, we have used the groups of the Clinical Classifications Software (CCS) (previously known as CCHPR) of the Agency for Healthcare Research and Quality (AHRQ) of the United States government.<sup>24</sup> The latest version



of this classification (2006) classifies the diagnostic and procedure codes of the ICD-9-CM in categories and major groups. *APPENDIX 1* provides a list of the **259 categories** (excluding E Codes) and **17 major diagnostic groups**, and *APPENDIX 2* provides a list of the **231 categories** and **16 major procedure groups**, with the surgical codes (underlined) differentiated from the nonsurgical codes.

- The external causes of injury and poisoning (**E codes**) were analyzed in a separate chapter from other diagnoses.
- The study of diagnoses and procedures was carried out by only bearing in mind the **main diagnosis** and **procedure**.
- The **mean** was calculated for the description of quantitative variables and, in the case of stay days, the **median** was also calculated, given that the distribution did not meet normal criteria.

Statistical analysis was carried out using the program SPSS 15.0.

*FIGURE 1 Healthcare regions (RS) and foreseen regional healthcare governments (GTS) of Catalonia in 2006.*

## Description of the Population Treated

The distribution by age and sex of the population treated differed

considerably from the distribution of the general population and varied depending on the type of resource where care was received (*FIGURE 2*).

In the case of acute-care hospitalization, the pyramid of the population treated was inverted with regard to the general population and was quite symmetrical, except in the 25-39 age bracket, which reflects the hospitalization of women for causes related to pregnancy, childbirth and puerperium.

Men in the 25-59 age bracket made up the population group that most often required admission to hospital for psychiatric disorders, while children and adolescents (ages 10 to 19) and women from 30 to 65 were the groups most treated in ambulatory mental-health centers.

The profile of the population treated at social-healthcare resources was the most different from the general profile of Catalonia. Nearly all cases, predominately women, were concentrated in the over-70 age bracket.

*FIGURE 2 General Catalan population and activity performed at different kinds of care resources, by age and sex. 2006*

## ACUTE-CARE HOSPITALIZATION

### Register of the Minimum Basic Data Set for Acute-care Hospitals (CMBD-HA)

#### Organization and Operations

The CMBD-HA register gathers data on the care activity of acute-care hospitals (standard hospitalization, major ambulatory surgery, day hospital and home hospitalization).

Every three months, hospitals send data on their activity to the register. After these data are received, they are validated and a report is drawn up summarizing the validated data and is sent to each hospital.

At the end of the year, acute-care centers receive reports on their activity related to standard hospitalization and major ambulatory surgery compared with that of other hospitals with the same characteristics. The data corresponding to this kind of activity are also sent to the Spanish Ministry of Health and Consumer Affairs so they can be entered in the national CMBD-HA.

#### Description of Specific Variables

Besides the variables common to the other CMBD registers, the following variables are also gathered for the CMBD-HA register:

#### Process-related variables:

- time of admission
- time of discharge
- care service authorizing discharge
- care number

#### Clinical-care variables:

- pregnancy time
- weight and sex of first child
- weight and sex of second child

#### Quality Control

In 2006, the CMBD-HA register received information from 86 centers: the 62 centers in the Public Use Hospital Network (XHUP) and 24 centers not for public use (*APPENDIX 3*).

The information from 2006 in the register represents 100% of the activity of the centers in the XHUP and 79% of the activity of the hospitals not in the XHUP. Overall, information on 95.7% of all activity in acute-care hospitals was provided. The amount of activity of the private centers that did not provide the register with information was estimated based on data from the *Informe d'establiments sanitaris en règim d'internat* (Report on Healthcare Establishments With Overnight Beds, EESRI) from 2004.

Compared with 2005, the increase in the total activity reported to the CMBD-HA in 2006 was 1.7% (*TABLE 1*). The most important increase occurred in activity grouped in the category 'Other Kinds of Care' (18.8%). Major ambulatory surgery continued to

increase, though the increase (8.5%) was lower than that of the previous year. There was also more day-hospital activity.

*TABLE 1 Number of contacts for standard hospitalization and major ambulatory surgery by kind of activity and year. 2005 and 2006*

### **Internal Validation**

The data received were validated internally to determine the quality of the information, detect errors in any variables and check consistency between variables. With regard to clinical variables, coding was done in accordance with the ICD-9-CM following the Normativa de codificació de les variables clíniques del CMBDHA de Catalunya (Rules for Coding the Clinical Variables of the MBDS-HA of Catalonia)<sup>25</sup>. The aim of these rules is to standardize coding criteria with regard to care episodes and follow the criteria established by the national reference group of the Spanish Ministry of Health and Public Affairs. The rules were prepared by CatSalut in collaboration with the coding group of the Catalan Society for Medical Documentation of the Academy of Medical Sciences of Catalonia and the Balearic Islands.

In the internal validation process, two new variables have been created based on the original variables: the patient's age (based on the birth date and date of admission) and the length of stay (based on the admission and discharge dates).

The validity of the variables corresponding to standard hospitalization and major ambulatory surgery in 2006 is shown below.

### **Personal identification variables:**

- Personal identification code (CIP): validity of 96.1% of contacts financed by CatSalut.
- Date of birth and sex: validity of 100%.
- Town of residence: validity of 99.4%.

### **Process-related variables:**

- Validity of more than 99.8% for the set of variables (except for the 'transfer supplying unit' variable, data on which was not provided in 6.9% of cases when the discharge circumstance was a transfer to another center).

### **Clinical-care variables:**

- Main diagnosis: validity of 99.5%.
- Mean number of diagnoses (main and others) per discharge: 3.42.
- First procedure: information provided in 80.9% of contacts. The validity of this variable when information was provided was 99.7%.
- Mean number of procedures (main and others, including external ones) per discharge: 1.50.
- External cause (1): validity of 90.8% in the reasons for admission for injury and poisoning.

## Perinatal variables:

Validity of more than 94% for all variables.

## Description of the Activity of Standard Hospitalization and Major Ambulatory Surgery

### Methodology

- The **type of activity** variable makes it possible to distinguish between different kinds of care, but the criteria for coding this care are often not standardized for all hospitals, which makes it difficult to compare data for analysis. Therefore, while respecting the type of activity originally indicated as much as possible, common criteria were applied to classify care in two main groups:
  - Standard hospitalization and major ambulatory surgery
  - Other kinds of care

Data corresponding to standard hospitalization and major ambulatory surgery were analyzed jointly because major surgery procedures that could be treated on an ambulatory basis might require the patient to be admitted, depending on comorbidity and the sociodemographic conditions of the patient and hospital access time. Given that one of the objectives of the CMBD is to analyze treated morbidity, analysis should be combined.

Data corresponding to other types of care were analyzed separately

because they corresponded to a type of activity that was considerably different from the main group of standard hospitalization and major ambulatory surgery.

Until 2002, the register's basic **analysis unit** was discharges. In order to use terminology adapted to the new modalities of hospital-care activity, the following definitions were drafted:

*The definition of **discharge** ("admitted patients who stay at least one night and then are discharged") does not fit in with the different types of activity contained in the CMBD of acute-care hospitals: standard hospitalization, major ambulatory surgery (CMA), day hospital, home hospitalization. Therefore, the concept of **discharge** was changed to **contact**.*

**Contact:** *the concept of contact is used to indicate each time a patient goes to an acute-care hospital to receive any kind of treatment.*

**Patient:** *the concept of patient is used to identify all the accumulated information from all contacts corresponding to the same person.*

- **Age** is calculated based on two original variables: date of birth and date care begins.
- **Length of stay** is a variable calculated based on the date care begins and the final day of treatment.
- In analyses based on age, sex and/or length of stay, a **null**

**contact** was understood to be one in which the information was not correct for any one of these variables (age of patient over 110 or unknown, sex different from male or female, and length of stay greater than 184 days).

- Contacts in which any one of the other variables was invalid were included in the **unknown** category of the corresponding variable.
- To study the hospitalization of Catalonia residents, **gross hospitalization rates** were calculated. For the comparison between regions, the rates were **standardized** using the direct method, by age and sex in the case of healthcare region (RS), and only by age for the regional healthcare government (GTS), given the low number of cases in some categories. This made it possible to avoid the effect of differences in population compositions. **Hospitalization rates** are expressed per 1000 inhabitants.
- The **variability** of hospitalization rates was measured using the following statistics tools:<sup>26</sup>
  - **Variation ratio (VR)**: the ratio between the highest and lowest variables observed (highest rate to lowest rate).
  - **Weighted coefficient of variation (WCoV)**: the result of dividing the standard deviation and the mean of the rates areas, weighted based on the population size of each area.

In the analysis of procedures in accordance with the CCS classification, contacts were grouped as **medical** or **surgical** as per Diagnosis-Related Groups (DRG) classification criteria, version CMS 22.0.<sup>27</sup>

- To evaluate the impact of major ambulatory surgery on surgical activity, the **replacement index (IS)** was used, understood as the percentage of contacts for a specific surgical procedure carried out as major ambulatory surgery out of all contacts for the same procedure, expressed as a percentage.
- Categories with **fewer than 50 cases** and those classified under the heading **Other Diagnoses and Procedures** were not included in the tables that provide a summary of contact characteristics classified in accordance with the CCS diagnosis and procedure groups.

## Analysis

### Contacts and Patients

The total number of standard-hospitalization and major ambulatory surgery contacts reported to the CMBD-HA in 2006 was 910,398, of which the personal identification code (CIP) was indicated in 715,957 (78.6%). Following the trend of recent years, a drop was observed in contacts in which the CIP was not provided (22.4% in 2004 and 21.4% in 2006). The number of patients whose CIP was indicated (543,396) increased by 1.6% compared with the

previous year, whereas the number of patients whose CIP was not indicated (169,556) dropped by 0.7% (*TABLE 2 and FIGURE 3*).

The mean number of contacts per patient was greater in cases in which the CIP was provided (1.32) than in those in which it was not provided (1.15). When the CIP was not provided, the contacts corresponding to the same patient were identified using the center code and the patient number. Bearing in mind that the same patient may have patient numbers at more than one center, the mean number of contacts per patient may be lower than the actual value.

Differences were also observed when analyzing patients who were admitted more than once. For those whose CIP was indicated (20.8%), the mean number of contacts was 2.52 and these patients generated 39.9% of all the contacts of this group. For those whose CIP was not indicated (10.1%), the mean was 2.30 and this group generated 22.6% of all contacts.

The mean number of contacts per patient also showed differences in terms of age group and sex (*FIGURE 4*). This indicator was calculated with the contacts in which the CIP was indicated. This figure went up with age, except for women in the 15-44 age bracket because, in this age group, there was considerable obstetric activity (which generally did not involve hospital admission). The number also went down for men and women over the age of 84.

The mean number of contacts per patient was higher among men (1.38 in men and 1.27 in women) overall and in all age groups. However, this difference was less evident in the under-15 age bracket.

*TABLE 2 Number of contacts and patients for standard hospitalization and major ambulatory surgery by year. 2005 and 2006*

*FIGURE 3 Patients and contacts for standard hospitalization and major ambulatory surgery, by the availability of the personal identification code (CIP). 2006*

*FIGURE 4 Mean number of contacts for standard hospitalization and major ambulatory surgery with personal identification code (CIP), per patient by sex and age group. 2006*

## **Age and Sex**

Of the total number of contacts, 420,923 (46.2%) corresponded to men and 489,235 (53.7%) to women. Compared with 2005, a 2.0% increase was observed in the number of women and a 1.2% increase was observed in the number of men. The number of contacts among women has increased each year, both in absolute and relative terms.

This can be explained by two factors:

- First of all, women over age 70 represent 7.7% of the population of Catalonia and men over that age represent 5.1%.

- Secondly, the increase in the birth rate and the comprehensiveness of the register (especially regarding notification by private centers with a considerable number of births) has contributed to the increase in obstetric activity (3.4% more compared with 2005).

In 2006, the mean age overall was 52.5 (52.8 in 2005) and the mean age of men (53.0) was higher than that of women (51.8). However, if obstetrics activity was not taken into account, the mean age of women was 55.6.

The distribution of contacts by age group, except for women of child-bearing age, was quite similar in both sexes, though some differences were observed in the age brackets at the high and low ends of the scale (FIGURE 5).

Contacts corresponding to women in the 25-39 age bracket represented 13.3% of all contacts and 24.7% of all female contacts. These data have been stable in the last few years.

Contacts of children under 15 represented 12.0% of all male contacts, and 7.2% of all female contacts.

In the higher age brackets, those accumulating the most activity among men were in the 65-79 age bracket (29.3%) and among women they were those in the 70-84 age bracket (25.2%). Women over 84 represented 4.0% of all contacts and men in that age bracket represented 2.3%.

The overall hospitalization rate was 126.4 contacts per 1000 inhabitants (124.4 in 2005) (TABLE 3). As in previous years, this rate continued to increase, probably due to the increased comprehensiveness of the register and the activity of the centers.

The hospitalization rate increased with age, especially among men. The highest rates corresponded to people in the over-75 age bracket: for a total number of 394.0 contacts in the 85-89 age bracket (491.8 men and 340.6 women). The lowest rate was in the 10-14 age bracket (31.1), especially among girls.

*FIGURE 5 Contacts for standard hospitalization and major ambulatory surgery of patients who are residents of Catalonia and of the population of Catalonia, by sex and age group. 2006*

*TABLE 3 Contacts for standard hospitalization and major ambulatory surgery by sex, age group and place of residence, and hospitalization rate of residents of Catalonia. 2006*

## Place of Residence

In 0.6% of contacts, the information on the 'town' or 'country of residence' variables was left blank or was incorrect. This percentage has gone down over the years.

With regard to the 'district' variable for patients living in the city of Barcelona, the level of invalidity was 19.4%, a figure that has been



nearly cut in half since 2004, which means there has been an improvement in the notification of administrative data.

Based on the town code, each contact was assigned to the healthcare region (RS) and regional healthcare government (GTS) of the place of residence. For contacts with residents of the city of Barcelona, notification of the municipal district varied considerably depending on the kind of financing: for contacts financed by CatSalut, the level of comprehensiveness was 98.2%, whereas for contacts not financed by CatSalut, the level was 10.1%. Therefore, the hospitalization rates per district were only analyzed for activity financed by CatSalut.

A healthcare region based on the place of residence could be assigned to 864,009 (94.9%) of the 910,398 contacts for standard hospitalization (HC) and major ambulatory surgery (CMA). For the other contacts, 20,622 (2.3%) corresponded to residents of Catalonia who could not be assigned to a healthcare region (RS), 15,878 (1.7%) were residents of Spain, 5,487 (0.6%) resided abroad, and the residence was unknown for 4,402 (0.5%) (*TABLE 4*).

Of the 864,009 contacts corresponding to patients residing in Catalonia with an assigned healthcare region (RS), 813,071 were attended to at hospitals in the healthcare region corresponding to their place of residence (relevance

index of 94.1%) and 50,938 (5.9%) were attended to at hospitals in other healthcare regions. The relevance index remained stable compared with 2005 (94.1%), after the increase observed in 2004 (81.1%). This can be explained by the changes in the boundaries of the healthcare regions in general, specifically those in Barcelona.

When healthcare regions were compared, this indicator showed differences ranging from 68.1% in the Alt Pirineu and Aran RS and 98.6% in the Barcelona RS.

Between 10.9% (Girona RS) and 18.6% (Central Catalonia RS) of patient contacts not treated in the RS corresponding to the patient's place of residence were treated in the hospitals of the Barcelona RS. It should also be pointed out that 7.6% of the activity generated by patients in the Terres de l'Ebre RS was carried out at centers in the Camp de Tarragona RS.

Of the 21,365 contacts in which the place of residence was outside Catalonia (15,878 residents of Spain and 5,487 residents of foreign countries), 65.6% took place in hospitals in the Barcelona RS and 14.1% in hospitals in the Lleida RS, most of which (2,465 contacts) corresponded to residents of the province of Huesca. Although in absolute terms the highest number of contacts of residents outside Catalonia (14,022 contacts, representing 2.1%) occurred in hospitals in the Barcelona RS, in relative terms, the percentage of



residents of Spain or residents of foreign countries was the highest (3,002 contacts, representing 7.3%) in the hospitals of the Lleida RS.

In accordance with current regional boundaries, the Barcelona RS provided coverage to 68.8% of the entire population of Catalonia (4,951,263 inhabitants), but the distribution of hospital resources was not uniform throughout Catalonia. Therefore, in order to carry out a detailed study of patient flows in this region, activity was analyzed specifically by grouping it in five regions (*TABLE 5*). When the Barcelona RS was treated as a single region, the relevance index was 98.6%, as can be seen in *TABLE 4*, but when this functional subdivision was used, the percentage of contacts of patients attended in the healthcare region corresponding to their place of residence was 79.0%. In these five regions, the value of this index ranged from 62.6% (Garraf and Alt Penedès) to 92.2% (city of Barcelona).

*TABLE 4 Number and percentage of contacts for standard hospitalization and major ambulatory surgery of residents of each healthcare region, based on the healthcare region of the hospital. 2006*

*TABLE 5 Percentage and number of contacts for standard hospitalization and major ambulatory surgery of residents of the Barcelona healthcare region,*

*based on the healthcare region of the hospital. 2006*

## **Hospitalization Rates**

The regional indicators of the use of resources were the gross and standardized hospitalization rates, itemized by healthcare region (RS) and regional healthcare government (GTS), in relation to the population of Catalonia in accordance with data in the central register of people with healthcare coverage (RCA) of 31 December 2005. These rates were calculated for the total number of contacts and those financed by CatSalut in each region.

When analyzing these rates, it is important to bear in mind that the register contains all contacts financed by CatSalut, but for contacts not financed by CatSalut (which mainly occurred in private hospitals), coverage was not 100%, as mentioned in the section on quality control.

When the hospitalization rate was analyzed, differences were observed in terms of the RS and the GTS (*TABLE 6*). Some of the lowest rates occurred among the oldest and population groups and some of the highest rates occurred among the youngest population groups. Cerdanya was the GTS with the highest gross and standardized hospitalization rates for all contacts and contacts financed only by CatSalut. The Baix Llobregat Nord GTS had the lowest gross hospitalization rates, regardless of financing, while the Barcelona GTS

had the lowest standardized hospitalization rates for contacts financed by CatSalut, and the Osona GTS had the lowest rates for all contacts. When this indicator was analyzed for the ten districts in the city of Barcelona, it was observed that the highest gross hospitalization rate corresponded to the Nou Barris district (103.6 per thousand inhabitants), but when it was analyzed by age, the Ciutat Vella district showed the highest hospitalization rate (105.6 per thousand inhabitants).

*TABLE 7* provides a summary of the regional variation of the hospitalization indicators for contacts financed by CatSalut in 2005 and 2006 based on the ratio between the maximum and minimum rates (maximum-to-minimum ratio) and the population-weighted coefficient of variation. The variation between regions with the highest geographic concentration (the six RSs and five regions in the Barcelona RS) was lower than that observed between the different GTSs, given that some of the extreme cases affecting rates calculated for smaller regions were compensated for. In the analysis of the variation of the hospitalization rate between RSs, a slight increase was observed compared with 2005 (the regional distribution of GTSs did not come into force until 2006). Contrary to what might be expected, the variation between standardized hospitalization rates was higher than the variation between gross rates.

With regard to the maximum-to-minimum ratio of the gross hospitalization rates for RSs, it was observed that the patients who were residents of the RS where the rate was the highest were admitted to hospital 47% more often than residents in the region where the rate was the lowest.

*FIGURE 6* shows the standardized hospitalization rate for contacts financed by CatSalut and by GTS of place of residence in relation to the overall rate of Catalonia, represented by the vertical line. The rate of the GTSs to the right of the line was higher than the overall rate and the rate of those to the left of the line was lower. The rates are arranged from the highest to the lowest and the confidence interval was 95%.

When analyzing the differences between rates, it is important to bear in mind that publicly financed hospital care in a region was conditioned by the availability of other kinds of complementary healthcare. More private healthcare was provided through private insurance institutions in urban areas and among people with a high socioeconomic level. This meant that, in certain regions, the hospitalization rate in centers financed by CatSalut was relatively low, as in the case of the Sarrià-Sant Gervasi district, where the standardized hospitalization rate was 42.3 per thousand inhabitants.

In some rural areas, where the low population density and existing

communications do not justify building a new hospital, primary healthcare assumes a replacement role in some care areas. In this case, hospitalization rates may also be low.

From the perspective of healthcare policy, in the areas with a low population density the existence of a hospital is justified when access is difficult due to geographic reasons. In this case, the hospitalization rates were higher than the mean because the availability of healthcare due to the proximity of a hospital, regardless of how small, increased the demand.

The scenario of an aging population in which the percentage of patients of advanced age with multiple pathologies was another of the factors that may have influenced the hospitalization rates of the population treated in general acute-care hospitals.

*TABLE 6 Rate of standard hospitalization and major ambulatory surgery, by healthcare region (RS) and regional healthcare government (GTS) of the place of residence. 2006*

*TABLE 7 Regional variation of hospitalization indicators of contacts financed by CatSalut. 2005 and 2006*

*FIGURE 6 Standardized rate for standard hospitalization and major ambulatory surgery of contacts financed by CatSalut, by the regional healthcare government (GTS) of the place of residence. 2006*

**Financial System**

The ‘financial system’ variable gathers the kind of organizations or institutions that finance patient hospitalization. Of the total number of contacts, 280 (0.03%) were not valid for this variable.

79.0% (719,322) of all the contacts in the register were financed by CatSalut, a percentage that was 92.4% if only contacts generated at XHUP hospitals were analyzed. The number of contacts financed by CatSalut in hospitals that did not form part of the XHUP and that notified the register was 10,902.

66.7% of contacts for standard hospitalization and major ambulatory surgery that were not financed by CatSalut corresponded to private insurance institutions and represented the same percentage as in 2005, although there was a 3.8% increase from one year to the other in absolute values. Of the total number of contacts not financed by CatSalut, 16.2% occurred in hospitals that formed part of the XHUP and the remaining 83.8% to centers that did not belong to the public network (FIGURE 7).

*FIGURE 7 Contacts for standard hospitalization and major ambulatory surgery, based on the kind of financing. 2006*

**Admission and Discharge Circumstances**

All contacts for standard hospitalization and major

ambulatory surgery were valid for the ‘admission circumstances’ variable.

Out of all contacts, scheduled contacts represented 52.7% and emergency contacts represented 47.3%. This distribution was 48.7% and 51.3%, respectively, in the hospitals that formed part of the XHUP, whereas in hospitals that did not belong to the XHUP the percentages were 71.6% and 28.4%, respectively.

For the ‘discharge circumstances’ variable, 0.1% of the contacts were not valid.

TABLE 8 shows the distribution of contacts in accordance with the place where patients went after being discharged. The greatest percent increase compared with 2005 occurred in the group of patients that started home hospitalization (48.8%), although there were only 1030 more contacts. On the other hand, the greatest increase in absolute figures occurred among patients who went home, with 13,100 more contacts, representing an increase of 1.6%. 52.9% of patients who continued with home hospitalization after being discharged were women with a mean age of 55.5. The percentage of women has remained stable in recent years, but the mean age increased by nearly one year each year in the 2005-2006 period. With regard to patients transferred to a center for medium- and long-term stays, 55.4% were women with a mean age of 77.6.

A reduction was observed in deaths compared with previous years (2.7% in 2000, 2.6% in 2005 and 2.4% in 2006).

The percentage of deaths was greater in contacts with emergency admission circumstances than in scheduled contacts (4.5% and 0.6%, respectively). Of all deaths, 74.5% corresponded to emergency medical contacts.

60.1% of deaths occurred among patients over the age of 74, 80.3% of whom had been admitted under emergency circumstances for a medical pathology.

*TABLE 8 Contacts for standard hospitalization and major ambulatory surgery according to the discharge circumstances. 2005 and 2006*

### **Length of Stay**

There were 138 contacts that were invalid for calculating the length of stay, representing 0.015% of the total (this percentage includes stays over 6 months).

The mean length of stay in 2006 for all contacts was 5.0 days (5.2 days in 2005) (TABLE 9). The distribution of contacts by the number of stay days was nearly the same as in the previous year, except for stays of 0 days, which increased due to increased activity in major ambulatory surgery (FIGURE 8).

This fact explains, to a great extent, the reduction in the mean length of stay in recent years. If this activity was not borne in mind, the mean

length of stay was 6.2 days, which was similar to the 2005 mean (6.4 days).

The mean length of stay is an indicator that is generally used for internal management and evaluation of healthcare services, but is a measurement that should be analyzed with care, especially when is used to describe hospital activity.

First of all, the weight of long stays should be borne in mind because, although these stays of more than 30 days represented only 1.6% of all contacts in 2006 (1.7% in 2005), they represented 16.2% of all stay days (also 16.2% in 2005).

Secondly, the mean length of stay presented considerable variability compared with other variables such as sex, age, admission and discharge circumstances and financing.

Thirdly, stay days did not follow what is known in statistics as a normal distribution (like the one followed by other variables that measure individual characteristics, such as age and blood pressure). Therefore, although the mean number of stay days (mean length of stay) for all contacts in 2006 was 5.0 days, half of the contacts involved hospital stays of 0 to 3 days (median length of stay). In other words, the lowest lengths of stay were the ones that accounted for the highest number of contacts (*FIGURE 8*).

Among men, the mean length of stay was 5.5 days and among women it was 4.6 days, whereas the

median length of stay was 3 days for both groups (*TABLE 10*). In general, a clear trend was observed of an increase in the mean length of stay as age increased, except in the group under one year old and women in the 20-39 age bracket as a result of obstetric activity in these age groups (*FIGURE 9*). Given that hospitalization for major ambulatory surgery did not generate hospital stays, when the length of stay of contacts for standard hospitalization was analyzed, the mean length of stay logically increased, especially in age groups in which there was considerable activity involving major ambulatory surgery. Among men in the 20-80 age bracket, the mean length of stay was about one day higher than among women in the same age bracket, whereas it was very similar among more extreme age groups.

Patients over 70 generated 32.9% of all contacts (*TABLE 3*) and accounted for 42.4% of all stay days (*TABLE 10*). In 2005, these figures were 32.8% of all contacts and 42.6% of all stay days.

In the description of the behavior of length of stay in relation to age, in addition to the mean and the median (50<sup>th</sup> percentile), the 25<sup>th</sup> and 75<sup>th</sup> percentiles were used for each age group, which represented the value of the stay days under which 25% and 75% of cases were found, respectively (*FIGURE 10*). In all groups, the median was lower than the mean, but the difference between

the two measurements was lower than in the 1-4 and 30-34 age brackets. In the first case, it can be explained by the fact that the stays were very short and similar to the mean, whereas in the second case this fact can be attributed to the influence of contacts caused by births in which the length of stay was generally very similar to the mean.

If length of stay was analyzed in accordance with the admission circumstances, it was observed that emergency admissions showed a mean stay of 7.2 days and scheduled admissions had a mean stay of 3.4 days (7.4 and 3.2 days in 2005, respectively).

The mean length of stay in accordance with the discharge circumstances also showed significant differences. The longest mean lengths of stay corresponded to patients sent to centers for medium- and long-term stays (15.3 days), those transferred to social residences (13.2 days) and those who died in the hospital (11.2 days).

In 2006, among contacts financed by CatSalut, the mean length of stay was 5.3 days and among those not financed by CatSalut, the mean length of stay was 4.0 days (5.4 days and 4.1 days in 2005, respectively). The fact that the mean length of stay of the contacts not financed by CatSalut was lower can basically be explained by the lower level of complexity of the treatments

*TABLE 9 Contacts for standard hospitalization and major*

*ambulatory surgery, mean and median lengths of stay, by stay days. 2005 and 2006 received by these patients.*

*TABLE 10 Stay days, mean and median lengths of stay of contacts for standard hospitalization and major ambulatory surgery, by sex and age bracket. 2006*

*FIGURE 8 Contacts for standard hospitalization and major ambulatory surgery by stay days. 2005 and 2006*

*FIGURE 9 Mean length of stay of contacts for standard hospitalization and major ambulatory surgery by age group, sex and type of activity. 2006*

*FIGURE 10 Mean and median length of stay and 25<sup>th</sup> and 75<sup>th</sup> percentiles of contacts for standard hospitalization and major ambulatory surgery, by age group. 2006*

## Diagnoses

The CMBD-HA register gathers the main diagnosis of each contact and as many as nine other diagnoses encoded in accordance with the ICD-9-CM.

The 'main diagnosis' variable indicates the reason the patient was admitted to hospital. The other diagnoses include all the disorders and complications the patient presented with that were not considered the main diagnosis and that were coexistent when the



patient was admitted or developed during the patient's stay at the center.

The percentage of contacts that were invalid for the 'main diagnosis' variable was 0.5% of the total number of contacts. A lack of specific information was the reason for invalidity in 0.3% of contacts. An unspecific diagnosis was understood to be one which did not provide as much detailed information as possible, even though the diagnosis was correct.

In 0.13% of contacts there was no information on the main diagnosis (the variable was left blank or an unknown diagnosis was indicated). The other reasons for invalidity were distributed among codes that did not appear in the ICD-9-CM and inconsistencies in terms of age and/or sex (0.07%).

66.6% of contacts correctly provided the first secondary diagnosis, 48.9% of contacts correctly provided the second secondary diagnosis and 37.0% correctly provided the third secondary diagnosis. These percentages were considerably higher than those of some years before (54.2%, 39.2% and 27.1% in 2002, respectively). It should be pointed out that 5.7% of contacts correctly provided all nine secondary diagnoses.

The mean number of diagnoses provided per contact (main diagnosis and others) was 3.42. This indicator was slightly higher than in 2004 (3.26).

The analysis of the diagnoses is presented for the major groups of the ICD-9-CM and for the CCS categories.

### *Major diagnostic groups of the ICD-9-CM*

Of the 18 major groups in this classification, the five with the most contacts were those corresponding to disorders of the circulatory system, the nervous system and the sense organs, the digestive system, complications of pregnancy, childbirth and the puerperium, and the respiratory system (TABLE 11). These groups accounted for 53.0% of all contacts. These five groups were also the most common in 2005 and represented 53.3% of all contacts.

When the number of contacts in 2005 was compared with those of 2006 for each group, it was observed that the numbers for all groups generally increased except in two cases (diseases of the respiratory system and congenital anomalies). In 2006, the number of patients with diseases of the respiratory system dropped by 5000 contacts compared with the previous year (going from 10.2% of all contacts in 2005 to 9.5% in 2006). In 2005 there was an increase of nearly 10,000 contacts of emergency activity in the first four months (going from 9.3% of contacts in 2004 to 10.2% in 2005). This fact coincided with an increase in the same period of the number of emergencies resulting in admissions handled in the Comprehensive

Emergency Plan of Catalonia. The activity caused by endocrine, nutritional and metabolic diseases and immunity disorders increased by 9.4% (though in the overall analysis of the contacts, it represented an increase of only 0.1%) and diseases of the skin and subcutaneous tissue increased by 16.8% (0.2% of the total). It should be noted that the number of contacts in which the main diagnosis was unknown was cut by more than half compared with 2005 (going from 3,945 contacts to 1,242), which means there was an improvement in data reported to the register (*TABLE 11*).

For the total set of contacts, the mean length of stay went down by 0.2 days compared with 2005.

Although each group covered very different diagnoses and disease types, it should be borne in mind that the longest mean lengths of stay corresponded to mental disorders, disorders arising in the perinatal period, and injury and poisoning, whereas the shortest mean lengths of stay corresponded to diseases of the nervous system and sense organs (this group included cataracts, which were mainly treated as major ambulatory surgery) and complications of pregnancy, childbirth and the puerperium.

The diagnostic groups that accounted for the most stay days were diseases of the circulatory system, neoplasms, injury and poisoning, and diseases of the

respiratory system, which represented 51.0% of all stays.

In relation to the mean age, significant differences were observed between the groups: the highest ages were among people with diseases of the circulatory system, diseases of the nervous system and the sense organs, and neoplasms; the lowest ages logically corresponded to perinatal disorders and congenital anomalies, followed by childbirth and infectious diseases.

For all contacts, the mean age remained stable compared with 2005. It also remained rather stable for major diagnostic groups, though there were variations of one or two years in the group of endocrine, nutritional and metabolic diseases and immunity disorders, diseases of the circulatory and respiratory systems, diseases of the skin and subcutaneous tissue, injury and poisoning, and the code V classification group (factors influencing health status and contact with health services). There were also differences in the distribution of contacts based on the reason for admission by patient age and sex (*TABLES 12 and 13*).

For both sexes in the under-15 age bracket, certain conditions originating in the perinatal period (under-1 age bracket) and diseases of the respiratory system (1-14 age bracket) were significant. In the other groups, differences were observed based on sex and age. In women, significant factors were childbirth (15-44 age bracket),



neoplasms (45-54 age bracket), diseases of the musculoskeletal system and connective tissue (45-74 age bracket), diseases of the nervous system and sense organs (65-84 age bracket) and diseases of the circulatory system (over-84 age bracket). Among men, significant factors included injury and poisoning (15-34 age bracket), diseases of the digestive system (35-54 age bracket), diseases of the circulatory system (55-84 age bracket), and diseases of the respiratory system (over-84 age bracket).

*TABLE 11 Contacts for standard hospitalization and major ambulatory surgery, mean and median lengths of stay and mean age, by main diagnosis, in accordance with the major diagnostic groups of the ICD-9-CM. 2005 and 2006*

*TABLE 12 Percentage of contacts for standard hospitalization and major ambulatory surgery of the three major diagnostic groups of the ICD-9-CM with the most contacts in each age group, in men. 2006*

*TABLE 13 Percentage of contacts for standard hospitalization and major ambulatory surgery of the three major diagnostic groups of the ICD-9-CM with the most contacts in each age bracket, in women. 2006*

### **CCS Diagnostic Categories**

TABLE 14 shows the total number of contacts, percentage distribution, mean and median

lengths of stay, mean age, percentage of contacts by women and percentage of deaths in 2006 for each diagnostic category, as well as the number of contacts and percentage distribution in 2005.

In terms of the number of cases and percentages, the activity reflected in the table is quite similar to that of the previous year for major groups and specific categories, except for respiratory diseases (as mentioned above), but there were also differences in the specific categories due to a change in the coding criteria of these categories (category 131 was once more restrictive, but can currently contain activity previously classified in categories 125 and 127).

Of the categories that increased the most in absolute terms compared to 2005, the following were of note: diseases of the genitourinary system (1,491 contacts), cataracts (1,337 contacts), prolonged pregnancies (830 contacts), trauma of the perineum and vulva during childbirth (814), and non-infectious gastroenteritis (783 contacts). Moreover, the categories that decreased the most (except for categories affected by the code changes mentioned above) were asthma (1,005 contacts), acute myocardial infarction (956 contacts), and varicose veins in the lower extremities (938 contacts), normal pregnancy and/or childbirth (522 contacts), and chemotherapy and radiotherapy (420 contacts).

In order to summarize the most important information in this table, a summary was prepared to identify the categories by code number (in parentheses) to make it easier to analyze the complementary information in the table. Cataracts continued to be the most common main diagnosis (7% of all contacts) and the one with the lowest mean length of stay (0.1 days). In general, the distribution of categories in terms of mean length of stay and mean age was similar to that of the previous year (in pathologies with a lower mean age, contacts with perinatal diagnoses were excluded). Given the low number of cases in most categories with the highest mortality, care should be taken when analyzing the variations observed from one year to the next.

*TABLE 14 Contacts for standard hospitalization and major ambulatory surgery, mean and median lengths of stay, percentage of women and deaths in accordance with the CCS diagnoses categories. 2005 and 2006*

#### *Summary of TABLE 14*

##### **Procedures**

The CMBD-HA register contains as many as ten surgical, obstetric, diagnostic and therapeutic procedures coded in accordance with the ICD-9-CM.

Of these ten procedures, eight referred to those carried out in the same hospital where the patient was

admitted and the other two to procedures for which the patient had to be transferred to another center.

This report presents an analysis of the first procedure, understood as the procedure performed on a patient during admission and the one most directly related to the main diagnosis. Information on this variable was reported for 735,740 contacts (80.9% of all contacts), 0.2% of which were not specific and 0.1% of which were incorrect or inconsistent with the patient's age and/or sex.

With regard to other procedures, the notification percentages were 39.4% for the second procedure, 15.7% for the third, 7.8% for the fourth, 4.1% for the fifth, 2.3% for the sixth, and 0.8% for the seventh.

The mean number of procedures indicated per contact was 1.52. The value of this indicator was practically the same as in 2004 (1.51).

The level of comprehensiveness of procedure reporting in the CMBD-HA register varied depending on whether or not the procedures were surgical. Surgical procedures were reported exhaustively, whereas the criteria of each hospital determined whether or not nonsurgical procedures were reported: some systematically reported all of them, while others did not report any. In 49.0% of contacts, one surgical procedure was reported; in 31.9% one nonsurgical procedure was

reported; and in 19.1% no surgical procedures were reported.

As in the case of the main diagnosis, the first procedure was analyzed with regard to the different group levels:

### ***Major Procedure Groups of the ICD-9-CM***

The distribution of contacts in accordance with these major groups has been relatively stable over the years, both in terms of the percentage distribution, the characteristics of stays (means) and the age of the patients on whom these procedures were performed (TABLE 15).

Operations on the musculoskeletal system, the digestive system and the eyes, and obstetric procedures represented 48.7% of the contacts in which the first procedure was reported (47.7% in 2004 and 48.6% in 2005). These procedure groups were the most common, without bearing in mind the ‘miscellaneous’ group, which is made up of a highly mixed group of procedures.

Compared with 2005, the number of contacts in which the first procedure was reported increased by 0.7%.

Activity increased in most procedures, except for operations on the nose, mouth and throat, the cardiovascular system, the blood and lymphatic systems, and the male genital organs. In most cases, the variations from one year to the next ranged in terms of percentages from 0.1% to 0.2%, except in the group of operations on the skin and

connecting tissue, which represented 0.5% of all activity in 2006.

Though each procedure group covered very different types of patients, the mean and median lengths of stay and mean age were analyzed for all of them. The longest mean lengths of stay corresponded to operations on the blood and lymphatic systems, and the respiratory system, whereas those with the shortest lengths of stay were operations on the eyes and ears, and on the nose, throat and pharynx. This last group appeared as a result of the great many operations performed as major ambulatory surgery.

In terms of age, the procedure groups with the highest mean age were operations on the eyes, the genitourinary system and the cardiovascular system. The lowest mean ages corresponded to operations on the nose, mouth and pharynx, obstetric procedures and ear operations.

For the entire group of contacts in which the first procedure was reported, the mean age remained virtually the same as in 2005. For major procedure groups, the mean age remained relatively stable, except for operations on the ears (which dropped by 1.6 years), operations on the nose, mouth, pharynx, and operations on the cardiovascular system, both of which increased by 0.8 years.

As in the case of the main procedure, there were differences in terms of age and sex in the

distribution of the contacts in which the first procedure was reported (TABLES 16 and 17).

The most common operations in children under 1 year of age were those of the nervous system. For girls in the 1-14 age bracket, the most frequent operations were on the nose, mouth and pharynx, whereas the most common among boys in the same age bracket were operations on the genitals. In the 15-44 age bracket, obstetric procedures were the most common among women, whereas among men in the same age bracket the most common were operations on the musculoskeletal system. This kind of operation was the most common in women in the 45-64 age bracket. Operations on the digestive system were one of the three performed the most on men of all ages, especially those in the 45-64 age bracket. Among men and women in the over-65 age bracket, the operations most frequently performed were on the eyes.

*TABLE 15 Contacts for standard hospitalization and major ambulatory surgery, mean and median lengths of stay and mean age, in accordance with the major procedure groups of the ICD-9-CM. 2005 and 2006*

*TABLE 16 Percentage of contacts for standard hospitalization and major ambulatory surgery of the three major procedure groups of the ICD-9-CM with the most contacts in each age group, in men. 2006*

*TABLE 17 Percentage of contacts for standard hospitalization and major ambulatory surgery of the three major procedure groups of the ICD-9-CM with the most contacts in each age group, in women. 2006*

**CCS Procedure Categories**

Except for 277 contacts that could not be classified in any of the CCS categories, of all the contacts in which the first procedure was reported (735,740), 60.6% (446,032) were surgical and 39.4% (289,431) were nonsurgical.

TABLE 18 shows, for each surgical-procedure category, the total number of contacts, percentage, mean and median stay days, mean age, percentage of female contacts and percentage of deaths, depending on whether the procedure was performed as standard hospitalization or major ambulatory surgery. In the case of major ambulatory surgery, the percentage of contacts was that defined as the **replacement index**. The considerable increase in the number of major ambulatory surgery procedures in recent years is worth noting, given that in 2003 they represented 31.1% of all surgeries and in 2006 this figure increased to 37.0%.

The CCS category groups with the most contacts were operations on the musculoskeletal system (14.1%), eye operations (10.9%), operations on the digestive system (9.5%), operations on the female genitals (4.8%) and operations on the cardiovascular system (4.2%).

When this detailed activity was analyzed by category, the most common procedures, regardless of the hospitalization system, were operations on the crystalline lens (8.7%), cesarean sections (2.6%), repair of inguinal and femoral hernias (2.4%), knee arthroplasty (1.9%), and removal and repair of bunions and other deformities of the big toe (1.5%).

In 2006, of the surgical procedures that increased the most in absolute values compared with 2005, the most noteworthy were peripheral-nerve decompression operations (9,521), operations on the crystalline lens (1,445), cesarean sections (771), repair of inguinal and femoral hernias (598), and removal of the semilunar cartilage of the knee (500).

The surgical procedures that decreased the most included sealing and removing varicose veins in the lower extremities (769), removing skin injuries (405), cosmetic surgery on the nose (375), circumcision (292) and endoscopies and endoscopic biopsies of the genitourinary system (184).

To summarize the most important information in this table, a *SUMMARY* has been created to identify the categories by the code number (between parentheses) to make it easier to analyze the complementary information in the table.

As has been observed in recent years, the most common categories of surgical procedures with

standard hospitalization were: cesarean sections, knee arthroplasty and repair of inguinal and femoral hernias. With regard to major ambulatory surgery categories, operations on the crystalline lens represented more than one third of this kind of activity (36.1% in 2006). Peripheral-nerve decompression operations continued to increase in absolute terms and in 2006 they represented 4.8% of all major ambulatory surgery procedures. A growing trend was also observed in absolute and relative terms of operations to remove and repair bunions and other deformities of the big toe.

In general, the mean age for categories of surgical procedures was higher in patients requiring standard hospitalization than in those treated through major ambulatory surgery. While the mean age of older patients in the five categories of standard-hospitalization procedures was always over 70, in major ambulatory surgery procedures it was only over 70 in two categories.

The categories with the youngest patients were nearly always the same from one year to the next, but they presented different characteristics depending on the kind of hospitalization. In the case of myringotomies and circumcisions, the mean age of patients operated on through major ambulatory surgery was higher (around age 22) than that of patients treated through standard

hospitalization (ages 8.3 and 10, respectively). However, patients who underwent tonsillectomies and/or adenoidectomies were younger in the major ambulatory surgery group (age 5.9) than in the standard hospitalization group (ages 11 and 7, respectively). With regard to abortions, the mean age of women was similar in both groups (around age 32).

Without considering the procedures exclusively for women, the three categories with the highest percentage of women were the same as in recent years, both for standard hospitalization and major ambulatory surgery: genitourinary incontinence procedures (97.9% through standard hospitalization and 97.5% through major ambulatory surgery), removal and repair of bunions and other deformities of the big toe (89.1% through standard hospitalization and 88.1% through major ambulatory surgery) and laparoscopy (82.5% through standard hospitalization and 98.9% through major ambulatory surgery).

In men, it is worth noting that the distribution of the categories with a higher percentage of men varied depending on the type of hospitalization, given that the percentage was high in both cases only in the repair of inguinal and femoral hernias (86.1% through standard hospitalization and 85.2% through major ambulatory surgery).

As expected, mortality was higher among patients who had undergone

procedures through standard hospitalization than among those who had undergone major ambulatory surgery. The two procedure categories in standard hospitalization with the highest percentage of deaths continued to be exploratory laparoscopy (20.4%) and temporary and permanent colostomies (14.1%). Mortality associated with procedures through major ambulatory surgery was very low: in 2006 deaths only occurred in four categories and mortality was below 0.6% in all of them except for percutaneous transluminal coronary angioplasty (1.3%).

As mentioned above, the contribution of major ambulatory surgery to the surgical activity of hospitals in Catalonia is gradually become more significant. The replacement index is used to monitor the development of this practice. The three categories with the highest replacement index (over 83%) were operations of the crystalline lens, circumcisions and peripheral-nerve decompression (*TABLE 19*).

In general, the replacement index has increased each year in most categories (around 5% in those categories that increased the most). The index for the removal and repair of bunions and other deformities of the big toe went from 48.9% to 54.6%.

To properly evaluate the impact of major ambulatory surgery on surgical activity, as well as the



increase in the replacement index, the number of contacts they represented should be borne in mind. For example, in operations on the crystalline lens, the difference between the replacement index in 2005 (91.1%) and 2006 (92.9%) was 1.8 (2,434 contacts). However, in the case of myringotomies, the difference between the two years was 3.8, but only represented an increase in activity of 270 contacts.

TABLE 20 shows, for nonsurgical procedures, the number of contacts, percentage out of all procedures (surgical and nonsurgical) of each category, percentage out of all nonsurgical procedures, mean and median lengths of stay, mean age, percentage of female contacts and percentage of deaths. When evaluating these parameters, it should be borne in mind that in most nonsurgical procedures, the length of stay was related more to the main diagnosis than to the procedure itself, unlike what happened in surgical procedures. For this reason, the summary of this table does not contain comparative data on stay days.

*TABLE 18 Contacts for standard hospitalization and major ambulatory surgery, mean length of stay, mean age, percentage of women and deaths, in accordance with the surgical-procedure categories of the CCS. 2005*

*Summary of TABLE 18*

*TABLE 19 Analysis of the evolution of the replacement rate (IS) of standard hospitalization performed as major ambulatory surgery. 2005 and 2006*

*TABLE 20 Characteristics of contacts with nonsurgical procedures, classified in accordance with the CCS. 2006*

*Summary of TABLE 20.*

### **Code E (External Cause)**

The analysis presented in this report refers to the first of the four external causes gathered in the register. It is compulsory to report this variable when the main diagnosis contains a reason classified within the major ICD-9-CM group of injury and poisoning, except in certain cases, such as medical and surgical care complications that are not classified anywhere else. The variable must also be reported when the main diagnosis cannot be classified in the major group of injury and poisoning but can be associated with an external cause, such as gastrointestinal hemorrhaging due to salicylate ingestion.

The percentage of contacts with admissions for injury or poisoning in which the external cause was correctly reported in 2006 was 90.8%, which was slightly higher than in 2005 (90.0%). In the remaining 9.2% of cases, the 'external cause' variable was not correct because it was not reported (8.8%) or because the code was wrong (0.4%).

Accidental falls were the most commonly reported external causes, both when the main diagnosis was the injury and poisoning group (25,847) and when it was other reasons for admission (18,798) (*TABLE 21*). The mean age of the patients in the first group (59.4) was higher than in the second (41.2), and women predominated in both groups (around 60%). Compared with 2005, admissions in which the external cause was a traffic accident dropped slightly and went from 9.6% (8,126) to 8.8% (7,876) of all external causes. While a slight downward trend was observed in the number of suicides (1,654 in 2003 and 1,376 in 2006), homicides tended to increase (656 in 2003 and 767 in 2006). The number of contacts in which the reported external cause was an accident (error) that occurred during medical or surgical treatment remained relatively stable: around 70 cases per year.

### **Perinatal Data**

Perinatal data were gathered in the variables ‘pregnancy time’ and ‘weight’ and ‘sex of children’.

These variables were reported whenever a childbirth occurred.

Of the 75,090 contacts in 2006 in which perinatal data should have been reported, 94.1% correctly reported the pregnancy time, 95.3% correctly reported the weight of the child, and 95.4% correctly reported the sex.

Compared with 2005, the number of childbirths increased by 3.4%.

The percentage of multiple childbirths (1.7%) was slightly lower than in 2005 (1.8%).

The mean age of the mother was 30.6 and 50% of the deliveries occurred among women whose age was 31 or lower.

In terms of the pregnancy time, 84.3% of the births occurred between weeks 38 and 41. 13.6% occurred before week 38 and 2.1% occurred after week 41. The mean weight of all children at birth was 3,239.4 grams; this indicator was directly related to the pregnancy time (*FIGURE 11*). 6.7% of the children had a weight at birth of less than 2,500 grams, 5.7% weighed over 4,000 grams and 42.0% weighed between 3,000 and 3,500 grams.

51.3% of the children were boys and 48.7% were girls (ratio of sexes: 1.05).

The number of deliveries was not uniformly distributed on the days of the week: around 15% of deliveries were handled on each day from Monday to Thursday, 14% were handled on Friday and around 12% were handled on the weekend, on Saturday and Sunday. This distribution was practically identical at all public centers. For private centers, the differences were more significant: deliveries handled on each day from Monday to Friday represented either 16% or 17% a day, whereas on weekends, 9.1% were handled on Saturday and 8.4% on Sunday.

The percentage of childbirths by cesarean section has increased in



recent years, going from 21.0% in 1999 to 25.6% in 2006. However, the evolution of this indicator was different depending on the ownership of the center: in the public sector, childbirths by cesarean section increased by 15.5% in this period (19.2% in 1999 and 22.1% in 2006), while in the private sector they increased by 24.8% (29.8% in 1999 and 37.2% in 2006) (FIGURE 12).

The mean age of women who delivered by cesarean section (31.6) was higher than that of those with vaginal deliveries (30.3). This circumstance occurred as much at public hospitals as private ones, but the women were older in private hospitals, both in cases of delivery by cesarean section (33.0) and vaginal delivery (32.7).

When the regional distribution of this practice was analyzed, considerable differences were observed depending on the healthcare region (RS) of the residence of the woman, which ranged from 22.9% (Girona RS) to 31.5% (Alt Pirineu and Aran RS) (FIGURE 13).

*TABLE 21 Contacts for standard hospitalization and major ambulatory surgery with external cause reported (code E of the ICD-9-CM), mean age and percentage of women, by diagnostic group and reason for admission. 2005 and 2006*

*FIGURE 11 Distribution of childbirths by weeks of pregnancy and newborn weight. 2006*

*FIGURE 12 Evolution of the percentage of childbirths by cesarean section by type of center. 1999-2006*

*FIGURE 13 Percentage of childbirths by cesarean section by the healthcare region (RS) of the woman's place of residence. 2006*

## **Description of the Activity of Day Hospitals and Other Kinds of Care**

This section of the report provides information on the hospital activity other than standard hospitalization and major ambulatory surgery. Given that the level of comprehensiveness of reporting in this kind of care is unknown and that it varies considerably between centers, the information contained in this section should be analyzed with caution.

## **Methodology**

Contacts were included that met the following criteria:

Contacts reported as home hospitalization.

Medical and scheduled contacts with a length of stay of 0 days.

Medical and emergency contacts with a length of stay of 0 or 1 day (less than 12 hours).

**Day hospitalization** (HdD) was understood to be scheduled medical or nursing care for patients requiring, in the same day, the application of specific treatments, the performance of specific diagnostic techniques or other

support services that would require standard hospitalization in other cases. Day hospitalization activity forms part of the gradual move toward handling certain care processes as part of hospitals' regular activity.

## Analysis

The total number of contacts for day hospitalization (172,175) and other kinds of care (62,424) reported to the register in 2006 was 234,599, a figure that represented an increase of 7.7% compared with 2005. Of this total number, 226,854 (96.7%) were medical and scheduled contacts with a length of stay of 0 days, which were mostly reported as day hospitalization.

The analysis presented below refers only to the 172,175 contacts considered to be day hospitalization.

The mean number of contacts per patient (3.25) was slightly higher than that of the activity of standard hospitalization and major ambulatory surgery (1.22), given that the patients at day hospitals generally received ongoing treatments. 17.9% of the day-hospitalization contacts corresponded to single-treatment sessions, whereas in the case of standard hospitalization and major ambulatory surgery, the contacts with a single admission represented 69.5% of the total.

50.7% of the day-hospitalization contacts corresponded to women and the mean age of all patients was

53.0 (55.0 for men and 51.2 for women).

The main diagnosis and the first procedure were analyzed using the CCS categories. *TABLE 22* shows the 15 most common diagnostic and procedure categories in 2006.

Logically, the most common diagnostic categories corresponded to neoplasms and chronic diseases (COPD, renal insufficiency, diabetes, etc.). Chemotherapy and radiotherapy were the main reasons for day hospitalization. The most common diagnoses and procedures showed a distribution that was very similar in 2005 in most cases (in number of contacts and percentages).

## MENTAL-HEALTH HOSPITALIZATION

### Register of the Minimum Basic Data Set for Hospitals in the Mental-Healthcare network (CMBD-SMH)

#### Organization and Operations

The CMBD-SMH gathers data corresponding to the activity carried out in the network of psychiatric hospitals, single-specialty psychiatric hospitals and other hospitals that have beds reserved for the network, but which are not psychiatric centers. All these hospitals send data corresponding to their activity to the register every three months (*APPENDIX 4*). After these data are received, they are validated and a summary of the validated data is sent to each hospital.

#### Description of Specific Variables

The CMBD-SMH register has only one specific variable:

Type of care unit:

- In psychiatric hospitalization, patients are treated in acute-care or subacute-care units, depending on the clinical characteristics the patients present with. **Acute-care units** provide care to patients in acute situations in which there is a serious psychopathological risk and who require immediate overnight care with intensive clinical action. **Subacute units**

regularly admit patients with mental disorders whose evolution may be chronic and which are often accompanied by social and family problems. Treated patients show great clinical complexity and major psychosocial destabilization, which is why they need specialized care at medium-term stay centers.

#### Quality Control

In 2006, the CMBD-SMH register received information from 22 hospitals (15 single-specialty hospitals and 7 general hospitals), which represented 100% of the contracted supplier units.

#### Internal Validation

The data received were validated internally to determine the quality of the information, detect errors in any variables and check consistency between variables. With regard to clinical variables, coding was done in accordance with the ICD-9-CM following the *Normativa de codificació de les variables clíniques del CMBDHA de Catalunya. 2006* (Rules for Coding the Clinical Variables of the MBDS-HA of Catalonia. 2006).<sup>25</sup>

The validity of the variables in 2006 is shown below.

#### Personal identification variables:

- Personal identification code (CIP): validity of 99.9% of contacts financed by CatSalut.
- Date of birth and sex: validity of 99.6%.

- Town of residence: validity of 99.5%.

#### **Process-related variables:**

- Validity of more than 99% for the set of variables.

#### **Clinical-care variables:**

- Main diagnosis: validity of 94.8%, which includes 1.3% of unspecified cases, i.e., data provided in three or four digits and used in three-digit diagnostic analyses. Data were not reported in 2.5% of cases and the diagnosis was incorrect in 2.7%.

First procedure: data provided in 80.0% of contacts. The validity of this variable when reported was 100.0%.

### **Description of the Activity of Mental-Healthcare Hospitalization**

The network of psychiatric hospitals is present throughout Catalonia and distributed in single-specialty psychiatric hospitals and the psychiatry services of general hospitals. This guarantees coverage for all patients in Catalonia. Although coverage is guaranteed for patients in the acute phase of disease, serious cases with long lengths of stay are sent to single-specialty psychiatric hospitals, even when the hospital is not in the patient's reference healthcare region.

Overnight psychiatric care was provided for the most part to adults. Children and adolescents were admitted occasionally in

extreme cases. These patients were treated at units in general hospitals and single-specialty psychiatric hospitals. Although resources were not uniformly distributed through the region, all patients were guaranteed access to care.

### **Methodology**

Contacts with single-specialty psychiatric hospitals were reported to the CMBD-SMH register and contacts with general hospitals were reported to the CMBD-HA register. Therefore, for an overall vision of psychiatric activity, both registers should be analyzed.

In this report, this activity is presented jointly or separately, depending on the kind of analysis.

As in the case of the CMBD-HA register, the measuring and analysis unit of the CMBD-SMH register was the **contact**.

**Age** was calculated based on two original variables: date of birth and date care began.

The characteristics were analyzed with the contacts classified according to the **main diagnosis**. The groups corresponded to **three-digit ICD-9-CM codes**.

The categories grouped under the heading '**Other Diagnoses**' have been excluded.

### **Analysis**

#### **Sociodemographic Indicators**

A total of 22,419 contacts was reported to the register, a figure that

has increased each year, especially the activity of psychiatric hospitals, which increased by 3.8% in 2006 compared with 2005 (*TABLE 23*).

*FIGURE 14* shows the percentage distribution by age group and sex of the contacts of residents of Catalonia and of the population of Catalonia in accordance with the central register of people with public healthcare coverage (31 December 2005). The percentage of activity generated by men in the 25-50 age bracket was higher than the percentage of the distribution of the population.

These population data were used to calculate the hospitalization rate, which was 30.5 contacts per 10,000 inhabitants.

*TABLE 24* shows the total number of contacts per healthcare region corresponding to place of residence and the distribution according to the healthcare region of the hospital where they occurred. Although, as mentioned above, there were some differences between the patients treated at one kind of resource or another, the resources available in the region complement each other and should therefore be analyzed together to gain an overall vision of overnight psychiatric hospitalization activity.

The healthcare region of the place of residence was assigned in 97.6% of all contacts. With regard to the other contacts, 1.2% corresponded to residents of Spain, 0.6% to foreign residents and in 0.2% of contacts, the place of residence was unknown.

In 85 contacts (0.4%) only the code of a Catalan province was reported, which means the contacts could be considered residents of Catalonia even though the healthcare region could not be assigned.

Of the 21,877 contacts corresponding to residents of Catalonia with an assigned healthcare region, 20,310 (relevance index of 92.8%) were patients who had been treated at hospital centers in the healthcare region corresponding to their place of residence and 1,567 (7.2%) were patients treated at hospitals in other healthcare regions.

The differences observed in the relevance index for the healthcare region, which ranged from 23.0% in the Alt Pirineu and Aran healthcare region (the patients who live in this region are generally treated at hospitals in Lleida) to 98.3% in the Barcelona healthcare region, can be explained by the fact that single-specialty psychiatric hospitals are not available in all healthcare regions and because the most serious cases have to be sent to other centers.

As mentioned above, the Barcelona healthcare region was analyzed in five subregions because 68.8% of the population of Catalonia lived in this healthcare region. When the Barcelona healthcare region was treated as a single regional unit, the relevance index was 98.3%, but when it was calculated bearing in mind functional subdivisions, the percentage of contacts of patients

treated in the healthcare region corresponding to their place of residence was 74.3%. The index ranged from 10.9% in the Garraf and Alt Penedès healthcare region to 80.8% in the Barcelonès Nord and Maresme healthcare region (TABLE 25).

*TABLE 23 Basic indicators and most common diagnoses of contacts at single-specialty psychiatric hospitals and psychiatric contacts at general acute-care hospitals. 2005 and 2006*

*TABLE 24 Number and percentage of contacts at single-specialty psychiatric hospitals and general acute-care hospitals based the place of residence of the patient and the healthcare region of the hospital. 2006*

*TABLE 25 Number and percentage of contacts at single-specialty psychiatric hospitals and general acute-care hospitals of residents of the Barcelona healthcare region, based on the area of residence of the patient and the healthcare region of the hospital. 2006*

*FIGURE 14 Contacts for psychiatric hospitalization of patients who are residents of Catalonia and of the population of Catalonia, by sex and age group. 2006*

## Process and Clinical Indicators

TABLE 23 shows some of the indicators for each kind of hospital. With regard to psychiatric hospitals, the indicators are presented with

the contacts broken down by type of care unit. For general hospitals, the indicators are shown for hospitals that had a psychiatry service and for those that did not.

In 2006, the number of contacts generated by psychiatric hospitals was higher than that generated by general hospitals. At psychiatric hospitals, 83.5% of contacts occurred at acute-care units; in the case of general hospitals, 54.9% of contacts were treated at psychiatry services.

The characteristics of the patients treated by kind of hospital or unit (acute-care, subacute-care, with or without a psychiatry service) showed differences that should be borne in mind when analyzing the results.

The percentage of men was higher than that of women in all of the resources analyzed. The mean age of the patients treated at psychiatric hospitals was lower than that of patients treated at general hospitals.

The mean length of stay showed very significant differences depending on the kind of hospital or unit. Especially in this indicator, the differences observed were directly related to the patients' clinical characteristics. This explains the difference between the mean length of stay of 7.9 days at general hospitals without a psychiatry service and the mean length of stay of 59.1 days at subacute-care units. Compared with 2005, the mean length of stay in acute-care units and psychiatry services remained

stable, whereas a gradual drop has been observed in the last three years at subacute units.

*TABLE 23* also shows the most frequent diagnoses of psychiatric hospitals compared with the distribution of the same diagnoses at general hospitals.

The six most-common diagnoses at single-specialty psychiatric hospitals represented 71.9% of the contacts of acute-care units and 77.3% of the contacts of subacute-care units. In the case of general hospitals with a psychiatry service, they represented 55.9% of all contacts, and in the case of general hospitals without a psychiatry service, they represented 33.8% of all contacts. Patients with schizophrenia or episodic mood disorders were those most treated at psychiatric hospitals, while the most common diagnosis at general hospitals was episodic mood disorders, followed by alcohol-dependence syndrome. It should be pointed out that the contacts generated at general hospitals that did not have a psychiatry service were very different from the profile of other centers, given that the incidence of the six main diagnoses was very low.

## AMBULATORY MENTAL-HEALTHCARE

### Register of the Minimum Basic Data Set for Ambulatory Centers in the Mental-Healthcare Network (CMBD-SMA)

#### Organization and Operations

The CMBD-SMA register gathers data on the care activity of the ambulatory mental-health centers in Catalonia.

#### Description of Specific Variables

The specific characteristics of each CMBD register give it specific variables in addition to the ones that are common to all registers. The specific variables of the CMBD-SMA register are as follows:

##### Clinical-care variables:

- first visit
- follow-up visits
- complementary tests
- individual psychotherapy
- group psychotherapy
- family treatment
- nursing care
- social work
- home visits
- unscheduled visits
- severe mental disorder
- severe mental disorder program

#### Quality Control

Of the 116 centers in the mental-health network contracted by CatSalut, 101 sent data to the

CMBD-SMA register in 2006. This information represented 87.1% of the centers (84.3% in 2005).

Coverage was good for all healthcare regions except for the Barcelona healthcare region, where it was only 82% (TABLE 26).

*TABLE 26 Coverage of the CMBD-SMA register by the healthcare region of the centers. 2006*

#### Internal Validation

The data received were validated internally to determine the quality of the information, detect errors in any variables and check consistency between variables. With regard to clinical variables, coding was done in accordance with the ICD-9-CM following the Normativa de codificació de les variables clíniques del CMBDHA de Catalunya. 2006 (Rules for Coding the Clinical Variables of the MBDS-HA of Catalonia. 2006).<sup>25</sup>

The validity of the variables varied considerably.

Following is the validity of the variables in 2006.

##### • Personal identification variables:

Validity of more than 90% for the set of variables.

##### • Process-related variables:

Validity of more than 90% for the set of variables.

##### • Clinical-care variables:

Main diagnosis: validity of 87.2%, which included 5.2% of



unspecified cases, i.e., three or four digits reported and used in the three-digit diagnostic analysis. 5.1% of cases were not reported and in 2.5% the diagnoses were incorrect.

Quantitative and qualitative quality problems were observed in the data for the CMBD-SMA register, which is why the level of coverage and the internal validity of the variables should be borne in mind when interpreting the indicators.

## Description of the Activity of Ambulatory Mental-Healthcare

### Methodology

- Unlike the CMBD-SMH register, in which the measuring unit is the contact, the CMBD-SMA register gathers accumulative information on each patient over the year. Therefore, the **measuring unit** is the **patient/year**. Although the centers send the data corresponding to their activity every three months, once the year has been closed, the data for each patient and each three-month period are grouped together so they can be processed as a whole.
- **Age** is calculated based on two original variables: date of birth and date care began.

The information is presented for all centers and the following two groups:

- Activity of mental-health **centers for children and adolescents (CSMIJ)**.

- Activity of mental-health **centers for adults (CSMA)**.

The reason these data were analyzed separately stems from the fact that the patients who received treatment at one kind of center or the other presented major differences (basically age related) in terms of the kind of pathology and treatment.

- The characteristics were analyzed of the contacts classified according to the **main diagnosis**. The groups corresponded to **three-digit ICD-9-CM codes** and the subgroups mainly to **four-digit codes** and, in some cases, **five-digit codes**.
- The **registers** considered **invalid** for the validation program of these variables **were excluded** from the analysis of the indicators related to age and sex.
- In the case of the ‘diagnosis’ and ‘place of residence’ variables, those considered invalid were grouped in the ‘**unknown**’ category.

### Analysis

#### Sociodemographic Indicators

The activity of the mental-health centers reported to the register in 2006 corresponded to 196,700 patients, 35.6% of whom were treated for the first time in 2006 (*TABLE 27*). Compared with 2005, the number of patients treated for the first time increased by 9.4%, whereas the overall increase in the

number of patients was only 6.5% because of the number of patients discharged.

Of all patients, 80,262 (41.3 %) were men and 113,861 (58.7%) were women. As in previous years, the number of women was greater than the number of men. In 2,577 patients (1.3%) the sex was unknown.

The 'age' variable was invalid in 2.1% of patients.

Of the 196,700 patients, 195,930 (99.6%) were reported to be residents of Catalonia, 697 (0.4%) were from outside Catalonia and in 73 cases the place of residence was unknown (*TABLE 28*). 97.4% of the patients who were residents of Catalonia, with the assigned healthcare region, were treated at resources in the healthcare region corresponding to their place of residence.

Figure 15 shows the percentage distribution by age group and sex of patients residing in Catalonia that appeared in the CMBD-SMA register in 2006 and of the population of Catalonia, in accordance with the central register of people with public healthcare coverage of December 2005.

To calculate the rates by age group and/or sex, 2,677 patients were excluded because the information was not correct for one of the following variables: age, sex or place of residence.

These data were used to calculate the rate of patients treated at

mental-health centers, which was 27.2 patients per 1,000 inhabitants (22.5 men and 31.1 women).

Differences were observed in the distribution by age and sex between patients treated on an outpatient basis and admitted patients (*FIGURES 14 and 15*). In hospitalization admissions, the percentage of men in the 25-49 age bracket was the highest, whereas the percentage of women in the 30-64 age bracket was the highest for ambulatory treatment.

### Clinical Indicators

Of all patients, 38,685 (19.7%) were treated at centers for children and adolescents (CSMIJ) and 158,015 (80.3%) at mental-health centers for adults (CSMA) (*TABLE 27*). Compared with 2005, a 13.9% increase was observed in patients at centers for children and adolescents and a 4.8% increase was observed in patients at mental-health centers for adults.

The patients treated at one kind of center or the other showed differences that were logically related to age, as well as to diagnosis and the type of treatment received.

A predominance of males was observed in the group of children and adolescent patients, while the percentage of women in the group of adult patients was higher than that of men (*TABLE 27*).

The number of first visits indicates that 42.2% of the total number of

children and adolescent patients were treated for the first time in 2006; in the case of adults, the percentage was 34.0%.

With regard to the number of follow-up visits per patient, the number was observed to be virtually the same for adults (2.7) and children and adolescent patients (2.3). In the case of visits per treatment, significant differences were observed between the two groups of patients; in children and adolescents the mean number of visits per treatment was 3.0 per patient, whereas among adults it was 0.8. These results were similar to those of 2005.

tables 30 and 31 show, for the 10 most common main diagnoses, the distribution of patients, mean age and the percentage of females in relation to the activity in centers for children and adolescents and centers for adults, respectively. Although patients with very similar diseases were grouped in each diagnosis, differences were observed, which is why the most significant ones in each group were also analyzed with more specific criteria.

For children and adolescent patients, the 10 most common diagnoses represented 78.2% of all diagnoses, while these diagnoses represented 80.1% of all diagnoses in adult patients.

When diagnostic groups in children and adolescent patients were analyzed specifically, it was observed that the adjustment reaction (20.5%) and specified emotional disturbance in children

and adolescents (11.1%) were the most frequent.

Although anorexia nervosa and other eating disorders did not appear among the most common diagnoses, they had considerable social impact, and in the group of children and adolescent patients they represented 2.7%. The prevalence of the hyperkinetic syndrome of children (11.0%) is worth noting, as it has been increasing significantly in recent years.

Among children and adolescent patients, the highest ages corresponded to patients diagnosed with eating disorders (anorexia nervosa and other eating disorders) and the lowest ages corresponded to mixed development disorder.

In adult patients, anxiety states (26.6%) and the adjustment reaction (18.9%) were the two most common reasons for treatment.

Adult patients with a diagnosis of a paranoid state had the highest ages, while patients with anorexia nervosa and other eating disorders had the lowest.

Anorexia nervosa and other eating disorders was the diagnosis with the highest percentage among females in both patient groups. The hyperkinetic syndrome of children in the group of children and adolescent patients and pathological gambling in adults were the diagnoses with the lowest percentage among women (*TABLES 30 and 31*).

*TABLE 27 Basic indicators of patients treated at ambulatory mental-health centers by type of center. 2005 and 2006*

*TABLE 28 Number and percentage of patients treated at ambulatory mental-health centers, based on healthcare region of the residence of the patient and the healthcare region of the hospital. 2006*

*TABLE 29 Number and percentage of patients treated at ambulatory mental-health centers who are residents of the Barcelona healthcare region, based on the area of residence and the healthcare region of the hospital. 2006*

*TABLE 30 Patients treated at ambulatory mental-health centers for children and adolescents, mean age and percentage of females by most common main diagnosis, in accordance with the ICD-9-CM. 2005 and 2006*

*TABLE 31 Patients treated at ambulatory mental-health centers for adults, mean age and percentage of women by most common main diagnosis, in accordance with the ICD-9-CM. 2005 and 2006*

*FIGURE 15 Patients who are residents of Catalonia and treated at ambulatory mental-health centers and the population of Catalonia, by sex and age group. 2006*

## SOCIAL-HEALTHCARE

### Register of the Minimum Basic Data Set for Social-Healthcare Resources (CMBD-RSS)

#### Organization and Operations

The CMBD-RSS register gathers data on the healthcare activity of the social-healthcare resources contracted by CatSalut.

This report considers **resources** to be all the care units and teams that perform social-healthcare activity. The resources were classified in the following groups:

#### Hospitalization Resources

Patients treated at this kind of resource received social healthcare on an overnight basis. Depending on the clinical characteristics of the patients, care was provided in the following units:

- Long-term stay units: they provided continuous care to patients with chronic diseases or processes with different levels of dependence and different degrees of clinical complexity who could not be treated at home. The purpose of these units was to provide the maximum comfort and independence, depending on the status of the patient, through the necessary treatment, prophylaxis of complications, rehabilitation treatment in the broadest sense, palliative treatment as necessary, and

psychosocial support, which also included the patient's family.

- Convalescent unit: they provided care to patients with diseases in the recovery phase of an acute process (medical, surgical or traumatological), with potentially recoverable loss of independence. The purpose of these units was to reestablish functions or stabilize the baseline dependence situation through reeducation of the activities of daily living and the adaptation to changes related to the disease so the patient could return home.
- Palliative-care units: they provided care to patients with diseases in an advanced terminal situation who needed their symptoms controlled or continuous treatments with admission and psychosocial care. The purpose of these units was to provide the best quality of life through palliative care and comfort.
- For reasons of efficiency, new forms of hospitalization resources have been added, known as multipurpose medium-term stay units, which were located in rural areas or areas with a low population density to treat both convalescent patients and patients needing palliative care. Because of the predominance of convalescent patients at these units, their activity was analyzed jointly with convalescent units.
- Interdisciplinary social-healthcare functional units (UFISS): they

were multidisciplinary units specializing in the field of geriatrics or palliative care that gave support to other professionals providing care to complex patients who presented with more than one pathology and were admitted to acute-care hospitals. The purpose of these units was to improve care for these patients by providing them with comprehensive care.

### Home-Care Resources

Patients treated at this kind of resource received healthcare at their place of residence by means of:

- **Home care program. Support teams (PADES):** they were specialized teams that provided primary-care support to patients with major diseases, chronic diseases and terminal diseases, especially in the most complex situations.
- **Direct ambulatory observational-therapy teams (ETODA):** they were teams that supervised the administration of drugs for tuberculosis in patients who did not follow the treatment well because of their own social problems.

### Ambulatory-Care Resources

Patients treated at this kind of resource received social healthcare without admission by means of:

- **Day hospitals:** these hospitals provided continuous care to patients with chronic diseases or processes with different levels of

dependence and different degrees of clinical complexity. The purpose of these units was to achieve the maximum independence possible through rehabilitative or palliative care and treatment to allow patients to continue living at home.

In the case of the CMBD-RSS register, the **information-gathering unit** of the register was the **evaluation** of the patient. However, the analysis presented in this report correspond to healthcare **episodes**.

*Evaluation: periodical crosscutting gathering of the patient's clinical and functional modifications during the healthcare episode. In the case of interdisciplinary social-healthcare functional units (UFISS) and palliative-care units, given that stays were short, a single evaluation corresponded to the information gathered upon discharge.*

*Episode: care for a patient, for the same reason, at the same unit or by the same care team, which was reflected in the sum of different evaluations gathered during a single year.*

The reporting units sent the data corresponding to their activity to the CMBD-RSS register once every six months.

After they were received, the data were validated and then the reporting units were sent reports on their activity and compared with the set of units of the same characteristics.

## Description of Specific Variables

The characteristics of each social-healthcare unit made it necessary to include specific variables for each one, in addition to the variables common to all the CMBD registers. The 114 specific variables(\*) of long-stay convalescent resources were as follows:

- reason for evaluation
- date of evaluation
- variables related to cognitive patterns (4)
- variables related to communication patterns (1)
- variables related to mood and behavior patterns (21)
- variables related to physical function and structural problems (18)
- variables related to continence (7)
- variables related to disease diagnoses (8)
- v• ariables related to health problems (7)
- variables related to nutrition (5)
- variables related to skin condition (19)
- variables related to staying awake during the day (3)
- variables related to drug administration (1)
- variables related to special treatments and procedures (9)
- variables related to therapies (19)
- variables related to therapies (3)

\* Number of variables in each chapter.

The clinical and functional characteristics of the patients treated at these resources meant that

their health status could change during the admission period. For this reason, during the same care episode, the register used the specific variables to gather different bits of information related to modifications in the patient's health status. The 'reason' and 'date of evaluation' variables reflected the cause and date of these changes.

The 144 remaining variables made it possible to classify patients in different degrees of complexity, in accordance with the Resource Utilization Groups classification system, 3<sup>rd</sup> version (RUG-III).<sup>28</sup>

## Quality Control

In 2006, the CMBD-RSS register received information from 357 supplier units (*APPENDIX 5*), which represented 92.5% of all the units that carried out activity contracted by CatSalut. Compared with 2005, the coverage of the register was improved by 9.6%. It should be pointed out that there was an increase in reporting by multipurpose medium-term stay units, the home-care program and support teams (PADES), the interdisciplinary social-healthcare functional units (UFISS), and the day hospitals. Despite increased reporting, the UFISS had the most difficulty reporting, as reflected in the low coverage percentage (67.2%) (*TABLE 32*).

## Internal Validation

The data received were validated internally to determine the quality



of the information, detect errors in any variables and check consistency between variables. With regard to clinical variables, coding was done in accordance with the ICD-9-CM following the *Normativa de codificació de les variables clíniques del CMBDHA de Catalunya. 2006* (Rules for Coding the Clinical Variables of the MBDS-HA of Catalonia. 2006).<sup>25</sup>

The clinical variables were validated in accordance with coding of the ICD-9-CM.

Following is the validity corresponding to the variables common to all the social-healthcare resources in 2006.

#### **Variables that identify the episode:**

- Validity of 100%.

#### **Sociodemographic variables:**

- Age: validity of 99.97%.
- Sex: validity of 99.97%.
- Place of residence: validity of 99.99%.

#### **Administrative variables:**

- Validity of more than 99.1% for all variables.

#### **Clinical variables:**

- Main diagnosis: validity of 98.4%, 6.4% of which were not specified.

*TABLE 32 Coverage of the CMBD-RSS register by type of resource. 2005 and 2006*

### **Description of the Activity of Social-Healthcare**

The descriptive analysis of the CMBD-RSS register presented in

this report refers to the activity generated by each social-healthcare resource in 2006. The information is presented for the whole set of resources and is also broken down for each service line.

Because of the characteristics of the patients treated at the different healthcare resources, both in terms of the functional status and therapeutic objective, the data were analyzed separately.

### **Methodology**

In 2006, the **episodes** analyzed in this report had the following characteristics:

- They began and ended in 2006.
- They began in years prior to 2006 and ended in 2006.
- They began in years prior to 2006 but had not ended by 31 December 2006.
- **Age** was calculated based on the date of birth and the final date of the period.

The **mean length of stay** was calculated based on the last date of care and the date the patient was admitted.

- The **episodes** considered **invalid** by the validation program for these variables **were excluded** from the analysis of the indicators related to age and sex.
- Based on some of the variables in the RUG-III classification system, the index of activities of daily living (ADL) and the cognitive performance scale (CPS) were prepared

The **ADL index** measures the ability to perform basic activities of daily living, such as bed mobility, getting around, eating, personal hygiene, getting dressed, using the toilet, etc. Index scores range from 4 to 18, with 4 corresponding to the most self-sufficient patient and 18 to the most dependent.<sup>28</sup>

The **cognitive performance scale (CPS)** measures the degree of cognitive deterioration. Information on coma status, memory (short-term and long-term), orientation in time and space, decision-making, making oneself understood, etc. is used to calculate CPS scores, which can range from 0 to 6, with 0 corresponding to patients with the least cognitive deterioration and 6 to those in a coma or a semi-coma.<sup>28</sup>

These two scales can be used to calculate the care episode at different times. In this report, the information is presented upon admission to describe the status of patients when they first enter the social-healthcare network.

## Analysis

### Episodes

The total number of episodes reported to the CMBD-RSS register in 2006 was 70,661. Of this number, 55,468 (78.5%) corresponded to episodes that ended in 2006, either because the patients were discharged or because they died (22.0% of all finished episodes). The other episodes (21.5%) corresponded to patients who

continued to receive care at any of the social-healthcare resources at 31 December 2006 (*TABLE 33*).

*TABLE 33 Social healthcare treatment episodes, mean age, mean length of stay, percentage of women and deaths, by type of resource. 2006*

### Sex, Age and Length of Stay

The 'sex' variable was not valid in 0.03% (24) of episodes. Of all the valid episodes (70,637), 30,804 (43.6%) corresponded to men and 39,833 (56.4%) to women.

The 'age' variable was not valid in 0.03% (26) of episodes. The mean age of the total number of valid episodes was 77.1 (74.2 for men and 79.4 for women).

*FIGURE 16* shows the percentage distribution by age bracket and sex of the episodes of patients who were residents of Catalonia that appear in the 2006 CMBD-RSS register and of the population of Catalonia. The social-healthcare resource-utilization rate was calculated based on these data.

This rate was 9.8 episodes per 1,000 inhabitants. It should be borne in mind that the data in the register was not comprehensive, which means the rate is slightly lower than the real value (*TABLE 34*).

By age bracket, the highest rates corresponded to patients over age 90, especially men. The rate of episodes clearly increased with age, which is why social-healthcare resources are oriented toward caring for the elderly, though not exclusively.

Episodes of patients in the 80-84 age bracket were the most common and represented 22.4% of the total. Women in this age bracket presented the highest incidence and represented 13.4% of all episodes and 23.8 % of all episodes in women. In men, the 80-84 age bracket was also the one with the highest incidence and represented 8.9% of all episodes and 20.5% of all episodes in men.

For the entire set of episodes that ended in 2006, the mean length of stay was 68.8 days, and the median length of stay was 22.0 days (*TABLE 33*).

Differences by kind of resource were observed in the three indicators studied. The highest frequency corresponded to interdisciplinary social-healthcare functional units (UFISS) and the lowest to palliative-care units. A small number of episodes was also handled by direct ambulatory observational-therapy teams (ETODA) (217), which could not be compared with the other social-healthcare episodes because these teams treated a population with a very specific pathology whose age and sex patterns were very different from the other episodes. The highest percentages of finished episodes were those of the UFISS and the palliative-care units. However, the reasons were very different: in the case of palliative-care units, the number of deaths produced among patients treated at this resource was high, whereas the

UFISS episodes ended because the patients were sent to other healthcare services after being evaluated (*TABLE 33*).

All the indicators studied showed differences related to the specific characteristics of each kind of unit or team. The most significant data from *TABLE 33* are summarized below:

- **Long-term stay units:** long mean length of stay of finished episodes (187.8 days); high percentage of unfinished episodes (49.3%); high percentage of women and mean age of episodes (62.4% and age 78.9, respectively). The major difference between the mean and median lengths of stay for this resource should be noted (187.8 and 56.0 days, respectively).
- **Convalescent units:** mean age (78.4), percentage of finished episodes (79.8%), much shorter mean and median lengths of stay (47.0 and 36.0 days), low percentage of deaths (11.4%).
- **Palliative-care units:** very high percentage of deaths (74.4%), percentage of men (61.4%) higher than the mean, lower mean age (73.3), very short mean length of stay of finished episodes (20.9 days), and much shorter median length of stay (11.0 days).
- **UFISS:** higher frequency (24.7% of all episodes), very short median length of stay (7.0 days) and lower percentage of deaths (10.9%).
- **PADES:** high percentage of deaths (35.3%) because of the kind of

patients treated; percentage of men (50.0%) higher than the mean.

- **ETODA:** teams that predominately treat men (66.4%) and young people (mean age 31.7) who were monitored for a median time of 179.5 days.
- **Day hospital:** low percentage of deaths (3.5%), long mean and median lengths of stay of finished episodes (187.6 days and 120.0 days, respectively).

*TABLE 34 Social healthcare treatment episodes, by sex, age group and place of residence, and the resource-use rate of residents of Catalonia. 2006*

### Place of Residence

In 0.01% (8) of episodes, the information on the 'town' or 'country of residence' variables was left blank or was incorrect.

TABLE 35 shows the number of episodes by healthcare region of the patient's place of residence and the distribution based on the healthcare region of the unit where the episode took place.

Of the 70,661 episodes, 70,470 (99.7%) corresponded to residents of Catalonia. With regard to the other episodes, 171 (0.24%) corresponded to residents of Spain and 12 to foreign residents; in 8 episodes the place of residence was unknown.

97.9% of patients residing in Catalonia with the healthcare region of residence assigned were treated at

resources in the healthcare region corresponding to their place of residence. All the regions had a relevance index of 94%.

As mentioned above, the Barcelona healthcare region (RS) was analyzed specifically by grouping its activity in five subregions (TABLE 36).

When the Barcelona RS was treated as a single regional unit, the relevance index was 99.0%, as shown in TABLE 35, but when this index was calculated bearing in mind this functional subdivision, the percentage of episodes of patients treated in the region corresponding to their place of residence was lower and ranged from 84.6% (Llobregat) to 95.8% (Garraf and Alt Penedès).

*TABLE 35 Social healthcare treatment episodes, based on the healthcare region of the residence of the patient and the healthcare region of the resource. 2006*

*TABLE 36 Social healthcare treatment episodes of residents of the Barcelona healthcare region, based on the area of residence and the healthcare region of the resource. 2006*

### Diagnoses

The 'main diagnosis' variable indicates the chronic reason requiring the most healthcare attention for which a patient was treated at a social-healthcare resource. The degree of invalidity of this variable for all episodes was 1.8%.

*FIGURE 17* shows the distribution of social-healthcare episodes by main diagnosis in accordance with the 18 major diagnostic groups of the ICD-9-CM.

The five groups with the most episodes were neoplasms, diseases of the circulatory system, injury and poisoning, mental disorders and diseases of the nervous system and sense organs. These groups accounted for 70.2% of all episodes. This distribution was very similar to that of 2005. In general, the number of cases increased in all diagnostic groups except for mental disorders and diseases of the respiratory system, which dropped slightly.

Patients treated at different kinds of units or by different teams presented significant differences in terms of pathology and the treatment received.

For each kind of resource and for the most common diagnostic groups of the CCS, the number of episodes, mean age, percentage of women and deaths, and the mean and median lengths of stay of finished episodes are presented (*TABLES 37 to 42*).

The most common diagnostic groups at the resources with the longest lengths of stay (long-term stay units and day hospitals) were organic disorders, senile and presenile dementia and acute cerebrovascular disease (*TABLE 37*). Also worth noting is the number of patients with multiple sclerosis at day hospitals due to the existence

single-specialty day hospitals for this disease (*TABLE 42*).

With regard to social-healthcare resources at acute-care hospitals (UFISS), interconsultations were carried out for the most part in cases of fractures in the neck of the femur and acute cerebrovascular disease (*TABLE 40*), as also occurred in the case of convalescent resources (*TABLE 38*).

At hospitalization resources for patients sent to palliative-care units, the six most common diagnostic groups corresponded to neoplasms (41.2% of all patients treated at this kind of resource). The neoplasm category with the most cases was the bronchi and lungs, followed by the colon and the rectum and anus (*TABLE 39*).

Home care provided by the support teams in the PADES program were basically targeted at two kinds of patients: those with organic disorders and senile and presenile dementia; and terminal patients with neoplasms (mainly of the bronchi and lungs or colon) from palliative-care units (*TABLE 41*).

Index of Activities of Daily Living (ADL) and Cognitive Evaluation

*TABLE 43* shows the distribution of the ADL index for long-term stay and convalescent units. It can be observed that the number of patients with severe dependence was higher in long-term stay units (42.2% and 29.2%, respectively), the number of patients with

moderate dependence was most frequent at convalescent units (42.7% and 29.6%, respectively), and there were practically no differences among patients with low dependence.

With regard to the cognitive performance scale (CPS), the differences between the two kinds of resources were very significant, especially with respect to extreme values (TABLE 44). The patients with maximum cognitive deterioration at long-term stay units represented 36.7%, whereas at convalescent units these patients represented 14.6%. This pattern was inverted when cognitive deterioration was low.

*FIGURE 17 Social healthcare treatment episodes of patients who are residents of Catalonia and the population of Catalonia, by sex and age group. 2006*

*TABLE 37 Social healthcare treatment episodes at long-term stay units, mean age, mean and median lengths of stay, percentage of women and deaths, by diagnostic category in accordance with the CCS. 2006*

*TABLE 38 Social healthcare treatment episodes at convalescent units, mean age, mean and median lengths of stay, percentage of women and deaths, by diagnostic category in accordance with the CCS. 2006*

*TABLE 39 Social healthcare treatment episodes at palliative-care units, mean age, mean and median lengths of stay, percentage of women*

*and deaths, by diagnostic category in accordance with the CCS. 2006*

*TABLE 40 Social healthcare treatment episodes at interdisciplinary social-healthcare functional units (UFISS), mean age, mean length of stay, percentage of women and deaths, by diagnostic category in accordance with the CCS. 2006*

*TABLE 41 Social healthcare treatment episodes treated through the home-care program (PADES) and direct ambulatory observational-therapy teams (ETODA), mean age, mean and median lengths of stay, percentage of women and deaths, by diagnostic in accordance with the CCS. 2006*

*TABLE 42 Social healthcare treatment episodes at day hospitals, mean age, mean and median lengths of stay, percentage of women and deaths, by diagnostic category in accordance with the CCS. 2006*

*TABLE 43 Daily living (ADL) index of the social healthcare treatment episodes by type of resource. 2006*

*TABLE 44 Cognitive performance scale (CPS) index of social healthcare treatment episodes by type of resource. 2006*





## ABBREVIATIONS

**ADL Index:** activities of daily living index.

**CatSalut:** Catalan Health Service.

**CCHPR:** Clinical Classifications for Health Policy Research.

**CCS:** Clinical Classifications Software.

**CIP:** personal identification code.

**CMA:** major ambulatory surgery.

**CMBD-HA:** Register of the minimum basic data set for acute-care hospitals.

**CMBD-SMH:** Register of the Minimum Basic data Set for Hospitals in the Mental-Healthcare Network.

**CMBD-SMA:** Register of the Minimum Basic Data Set for Ambulatory Centers in the Mental-Healthcare Network.

**CMBD-RSS:** Register of the Minimum Basic Data Set for Social-Healthcare Resources.

**CPS:** cognitive performance scale.

**CSMA:** mental-health centers for adults.

**CSMIJ:** mental-health centers for children and adolescents.

**ETODA:** direct ambulatory observational-therapy teams.

**GTS:** regional healthcare government.

**HdD:** day hospitalization.

**HC:** standard hospitalization.

**ICD-9-CM:** International Classification of Diseases, 9<sup>th</sup> Revision, Clinical Modification.

**IS:** replacement index.

**PADES:** Home care program. Support teams.

**RCA:** Central register of people with public healthcare coverage provided by the Catalan Healthcare Service.

**RS:** healthcare region.

**UFISS:** interdisciplinary social-healthcare functional units.



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